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THE WATER SUPPLY OF CAMBRIDGE



A BRIEF HISTORY

COMPILED BY

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CAMBRIDGE UNIVERSITY AND TOWN
WATERWORKS COMPANY

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THOUGH water is a basic requirement for the life of man and beast, town dwellers in this country have become so accustomed to the provision of taps in their houses yielding a plentiful supply of pure wholesome water, that few of them bother to consider whence this water comes, or what their ancestors did for water before it was made easily available.

Nevertheless, the supply of pure water to individual houses by means of pipes is one of the great social achievements of the last century, and the hundredth anniversary of the incorporation of the Cambridge University and Town Waterworks Company is a fitting occasion on which to survey what water supplies were available to earlier generations before the Company brought piped water into Cambridge for a population then less than 30,000, and how the Company's works have since been developed, enlarged and improved in providing for the needs of a population which has now reached 110,000.

MEDIEVAL CAMBRIDGE

Medieval Cambridge obtained its water partly from wells, partly from the river, and partly from an artificial channel known as "The King's Ditch," which defended the town on the south and east. Its course left the river near Silver Street and, passing by way of Pembroke Street, Hobson Street and Park Street, rejoined the Cam near Magdalene College. As the river and the King's Ditch were also used for disposal of refuse, their waters must have been grossly polluted, and the water drawn by pumps or buckets from shallow wells among the thickly clustered houses, where drains were non-existent, can have been little better. Small wonder that pestilences were rife and mortality high.

The first steps to supply a pure water from outside the town were taken as long ago as 1325 by the Franciscans or Grey Friars. They selected a spring issuing from the gravels which underlie the rising ground on the west of Cambridge now occupied by the Observatory and University Farm, and laid a lead pipe from it for a distance of a mile-and-a-half to their buildings which stood upon the site now occupied by Sidney Sussex College. After traversing what was then open field and crossing under the river Cam, this pipe passed along a lane subsequently incorporated in the Great Court of Trinity College. Following the suppression of the House of the Franciscans by Henry VIII, this conduit was granted by him to Trinity College in 1546, and was used to supply the noble fountain in the Great Court, which remained for some 300 years the main source of water for the College, while a tap, which still exists, outside the Great Gate, provided a supply for the public.

HOBSON'S CONDUIT

With the growth of the University and the Town, the need for pure water became ever more pressing, and in 1574 Dr. Andrew Perne, Master of Peterhouse, in writing to the Chancellor of the University, Lord Burghley, upon an outbreak of the plague in Cambridge, expressed the view "our synnes is the principall cause: the other, as I conjecture, is the corruption of the King's Ditch." He went on to suggest that a stream flowing from the Nine Wells, a group of strong springs situated near the present railway line between Cambridge and Shelford, should be led into a conduit to bring the water into Cambridge and to flush the King's Ditch.

This wise suggestion was eventually carried out in 1610 as a joint undertaking of the University and Town, and a new open channel was dug from the Nine Wells to bring the water to the outskirts of the town, whence part of it was piped to a fountain in the Market Place and part used to cleanse the King's Ditch and various drains and watercourses belonging to Colleges. The King's Ditch has long since been filled in and built over, but the pleasant brook, now known as Hobson's Brook, continues to this day to supply water to a fountain in the Market Place, though this is not the fountain erected in 1614 which was removed to a position at the corner of Trumpington Road and Lensfield Road when the Market Place was enlarged a century ago. An inscription on the old fountain states that it was built at the sole charge of Thomas Hobson (the carrier whose memory is perpetuated in the phrase "Hobson's choice"), but Hobson was in fact only one of a number of public-spirited citizens who contributed to the undertaking. This brook is also the source of the rippling streamlets flowing on either side of Trumpington Street and St. Andrew's Street, which attract favourable comments from so many visitors to Cambridge, even if sometimes erroneously ascribed to waste of the Water Company's resources!

AN ABORTIVE SCHEME

Though from a Petition presented to Parliament in 1788 asking for water from Hobson's Conduit to be made more widely available to the inhabitants, there is evidence that the problem of providing more plentiful supplies of water was continuing to exercise the minds of the leading members of both the University and Town, nearly two-and-a-half centuries elapsed before definite steps were taken to provide further supplies. In 1850 a Bill was promoted in Parliament for the incorporation of a "Cambridge Water Works Company" which proposed to take water from Hobson's Brook and also from the Paper Mills stream which flows from a large spring at Cherry Hinton and crosses under the Cambridge-Newmarket Road near the present railway bridge. This water was to be led to a low-level reservoir beside the river on Coe Fen and, after filtration, pumped to a high-level reservoir on Madingley Hill to give the necessary head for distribution of the water to the inhabitants of Cambridge and neighbouring villages. It appears that the promoters were a small and far from representative body and that the Bill was drafted in great haste

without prior consultation with interested parties. Consequently, petitions against it were lodged by the University and Corporation, as joint Trustees of Hobson's Brook, by certain Colleges, and by the Improvement Commissioners, and the Bill was speedily abandoned, the promoters losing 10/- in the £ of their deposits.

"A GOOD AND HONEST COMPANY"

Notwithstanding these petitions, the desirability of securing a public water supply for Cambridge was strongly felt by those living in the Colleges and by residents in the town. In the summer of 1852



FLEAM DYKE PUMPING STATION.

the Vice-Chancellor, Dr Richard Okes, Provost of King's College, took the lead by writing to the Heads of the other Colleges and to a number of other prominent citizens, inviting them to serve on a Provisional Committee to promote an undertaking to supply the town with water from the Paper Mills stream, the water rights of which he had prudently secured in advance with the financial aid of a number of guarantors, among whom was Dr. Whewell, Master of Trinity.

It is clear from letters and comments which had already appeared in the local Press that the circumstances in which the scheme of 1850 had been put forward had aroused suspicion of the motives of the promoters. It is interesting to notice that Dr. Okes' letter to Dr. Whewell inviting him to be a guarantor expressly disclaims any desire to secure personal profit from the scheme and expresses his anxiety to see "a good and honest Company established who will honourably undertake ye public benefit in this matter.

Having issued these invitations, Dr. Okes convened a meeting at the Provost's Lodge, King's College, on 29th September 1852, "to confer upon the propriety of applying to Parliament at the next session for an Act to establish a Company for supplying the University and Town with water from the Paper Mill stream." Ten prominent members of the University, including the Dean of Ely and the Masters of three Colleges, the Mayor and twelve townsmen, attended this meeting, at which a Committee consisting of the Vice-Chancellor, the Mayor, the Master of Trinity and five other citizens were appointed to make further enquiries. As a result of their deliberations Mr James Simpson, an eminent civil engineer of Westminster, was retained to prepare a scheme for the collection and distribution of water from the Paper Mill stream, and an application for an incorporating Act duly lodged in Parliament in November, 1852.

RIVAL SCHEME ABANDONED

A rival scheme had, however, appeared in the field, put forward by some of the promoters of the ill-fated undertaking of 1850, who also made an application to Parliament in November, 1852, for an Act to establish a "Cambridge Waterworks Company," which would take its water from the River Cam in the neighbourhood of the present Bathing Sheds with a low level reservoir and filtration plant near Newnham Mill, and a high level reservoir on Madingley Hill.

The proposal to abstract a large volume of water from the river was not well received by riparian owners and millers, and the suggested use of river water, even though filtered, was a much less attractive proposal than the use of spring water from the Paper Mill stream. Feeling, no doubt, that their Bill had small chance of success in competition with the proposals of the Cambridge University and Town Waterworks Company, the promoters of the river project ultimately agreed to retire from the Parliamentary field upon the consideration of the payment of £400 compensation money, and the way was left clear for the present Company's incorporating Act to pass through Parliament in 1853.

This Act authorised the issue of shares of £10 each to the value of £25,000, and the borrowing on mortgage of a further £5,000. The deposited plans showed as the intended sources of supply a collection chamber at "The Spring Head" beside the cross-roads at the south end of Cherry Hinton village, which constitutes the source of the Paper Mill stream, and also a well in the Lower Chalk not far from the Spring Head and some two-and-a-half miles distant from the centre of Cambridge. The area of supply comprised the Town and University of Cambridge and eight adjoining parishes.

THE ORIGINAL BOARD OF DIRECTORS

Inasmuch as resident members of the University had played so prominent a part in promoting the undertaking, it was arranged that half the original Board of Directors should be members of the University, and half members of the Town, but since at that date practically all Fellows of Colleges were obliged by their College

statutes to be in Holy Orders, it was necessary to insert in the Act a special provision that "Spiritual Persons," if and so long as they occupied positions as Heads, Bursars or resident Fellows of Colleges, should not be disqualified from becoming Directors of the Company. This arrangement of equal representation of the University and Town upon the Board of Directors proved eminently satisfactory alike to shareholders and to members of the Board, and has continued unchanged to the present day.

The original Board of Directors was constituted as follows: The Rev. William Whewell, D.D., Master of Trinity; Rev. Richard Okes, D.D., Provost of King's; Rev. George Elwes Corrie, D.D., Master of Jesus; Rev. John Fenwick, M.A., Bursar of Corpus Christi; Rev. William Bonar Hopkins, M.A., Tutor of St. Catharine's; Alderman Elliot Smith, J.P., Estate Agent and Surveyor (Mayor); Alderman Joseph Wentworth, J.P., Auctioneer; Alderman William Warren, J.P., Grocer; Rowland Morris Fawcett, Surgeon; Henry Hazard, Coal and Corn Merchant.

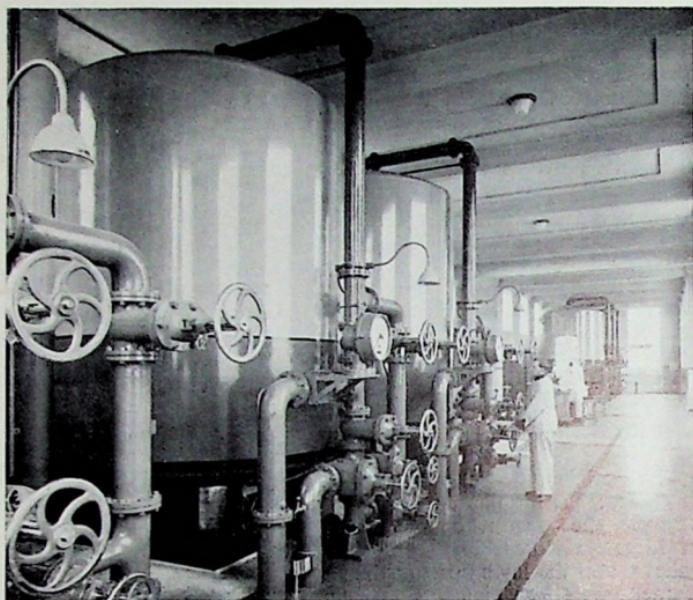
THE ORIGINAL WORKS

The original works, comprised the sinking of a well to a depth of 48 feet, the installation of pumping machinery (two 15 h.p. beam engines), the construction of a covered service reservoir on the top of Limekiln Hill, Cherry Hinton, having a capacity of one million gallons, and the laying of some twenty-six miles of 5-inch to 12-inch diameter cast iron mains at an inclusive cost of £28,632.

The opening of the Company's works took place on 23rd October, 1855. The "Cambridge Chronicle," describing the event, states: "We do not know that upon any former occasion we witnessed so satisfactory a union of the Town and University as in the celebration of the event we are about to record. The two bodies were engaged in a good work, calculated to benefit the inhabitants of this place for ages to come." The party, which included Dr. Whewell, the Master of Trinity (Chairman), the Vice-Chancellor, the Deputy Mayor, the Professor of Geology (Adam Sedgwick) and Colonel Adair, M.P., first inspected the pumping station at Cherry Hinton and the reservoir, where, after witnessing the admission of the water, they filled their glasses with a stronger beverage to drink prosperity to the Company. On their return to Cambridge jets of water, discharged into the air from standpipes on Market Hill, King's Parade, and in front of the Town Gaol, to the discomfiture of some unwary spectators, inaugurated the arrival of the water in the Town. In the evening the proceedings were brought to a close by a dinner at the Lion Hotel, at which the Toast List contained the names of no less than twenty-five speakers!

SLOW PROGRESS

As the charges levied by the Company were extremely modest, it might have been expected that there would be a rush to take supplies. In fact progress at first was slow: by the end of the first fifteen months only some 600 houses and four colleges had taken supplies from the Company's mains, and it was not until 1860, by



THE WATER SOFTENING PLANT.

which date 1,500 supplies had been laid on, that the Company paid its first dividend, a modest 1%. By that time, however, the success of the undertaking was assured, though it was not for a further fifteen years that the full statutory dividends were paid, and it is, perhaps, worth recording that, for the first thirteen years of the Company's existence, its ten directors, who met fortnightly, gave their services gratuitously.

In the years 1855, 1866 and 1871, the Company obtained further Acts authorising the creation of additional capital, the extension of the area of supply and the purchase of land for protection of the purity of the wells. Further measures to augment the supply and improve the distribution system had also become advisable, and in 1883 two additional wells were sunk in the Lower Chalk and a 12-inch bore hole carried down 200 feet to tap a deeper water-bearing stratum, the Lower Greensand. Two additional pumping engines, each of 30 h.p. and capable of delivering at the rate of three-quarters of a million gallons a day, were installed, and these measures enabled the Company to cope with the ever-increasing demand for water for another ten years.

WATER FROM FULBOURN

It then became necessary to look further afield for additional supplies, and these were obtained at Fulbourn, where another large spring, "Poors Well," issues from the Lower Chalk five miles east

of Cambridge. Parliamentary sanction was granted in 1886 for the construction of new works, and under a scheme prepared and carried out by Mr. Charles Hawksley at a cost of £28,400, a pilot shaft 70 feet deep and pumping well 50 feet deep were sunk side by side in the Chalk, and two vertical steam-driven pumps capable of delivering at the rate of one million gallons a day were installed, the Fulbourn water being first taken into supply in March, 1891.

These pumps did not, however, utilise the full capacity of the Fulbourn well, and in 1897 the installation of larger pumps capable of delivering a million-and-a-half gallons a day was carried out, increasing the combined resources of the Cherry Hinton and Fulbourn wells to some two-and-a-half million gallons a day, which proved adequate to cope with public demand until after the first world war.

The next milestone in the Company's history resulted from a typhoid-scare in 1903, when cases of this disease occurred at the Fulbourn Asylum, and anxiety was expressed in certain quarters lest the Company's Fulbourn well might become polluted from the sewage disposal works of the Asylum, which were then of a somewhat primitive nature. The Company had already instituted in 1898 daily bacteriological examinations of their water under the Professor of Pathology in the University, and in no single case had any pathogenic organism been detected, nor had the frequent chemical analyses ever indicated any lack of purity of the water. Two Local Government Board Inquiries were held, in 1905 and 1908 respectively, and although on each occasion exhaustive investigations were made, no evidence was obtained that pollution had occurred, or was likely to occur. Nevertheless, a Local Government Board Inspector expressed the view that "a potentiality of danger" existed, and the Company's Board of Directors, determined that no shadow of suspicion should rest upon the complete purity of the water they supplied, at once tackled the question of chemical sterilisation of the whole of their supplies.

PIONEERS IN CHLORINATION

Though such sterilisation has now become a routine procedure, and during the recent war was even made compulsory upon all water undertakings by Government order, it was then quite untried on a large scale, and the Company had first to construct an experimental plant at which the methods and dosage required could be worked out. This was erected at Fulbourn, beside the pumping station, and was capable of dealing with 168,000 gallons a day. Chlorine, produced on the spot from bleaching powder, was administered in doses varying from one to one-eighth part per million, and in every case complete sterilisation was obtained. After a three-months' satisfactory test, the Directors in 1910 promoted a Bill in Parliament asking for powers to sterilise, either by chlorine or by ozone, both the Cherry Hinton and Fulbourn waters, or in default of such powers, to establish a new well and pumping station at a site in the open country beside the Fleam Dyke, one-and-a-half miles south-east of the Fulbourn well, and nearly twice that distance from the Asylum sewage disposal works. It is believed that this was

the first attempt made by any water undertaking in this country to obtain statutory powers for the routine chlorination of a public supply, and despite the evidence given for the Company before a House of Lords Committee by some of the leading experts of the day as to the effectiveness of sterilisation and the wholesome quality of the water after treatment, including the ocular proof of a number of tadpoles thriving in a bowl of chlorinated water, the Committee rejected both this application and the application to sterilise by means of ozone.

THE FLEAM DYKE WORKS

Parliamentary sanction was, however, given in August, 1910, to the vastly more expensive alternative of constructing a new well and pumping station and the Westminster firm of consulting engineers, Messrs. T. & C. Hawksley, prepared the plans. In July, 1911, the sinking of the present Fream Dyke well was begun and the whole scheme, including the provision of an additional service reservoir holding a million gallons, should have been in operation by 1915. The first World War, however, so interrupted the delivery of the plant that it was not until February, 1921, that the new works were finally completed and put into service, at a total cost of £101,000, necessitating the raising of a much larger amount of new capital than had been anticipated, with the result that for the period 1919 to 1921 the dividends paid to the Company's stockholders had to be reduced below their statutory maximum.

The Fream Dyke well, from which the great bulk of the Company's water is now derived, is sunk to a depth of 162 feet (39 feet below sea level) in the Lower Chalk formation, and is elliptical in plan (21 feet by 14 feet). Eighteen feet above the bottom of the well two horizontal adits have been driven, one in a north-westerly direction for a distance of 90 feet, the other in a south-westerly direction for a distance of 192 feet. These adits intercept numerous water-bearing fissures in the Chalk and thus powerfully augment the resources of the well, which is capable of yielding as much as four-and-a-quarter million gallons a day in the spring, when the water capacity of the Chalk is at its maximum after the winter rains, and in thirty years has never fallen below three-and-a-quarter million gallons a day, notwithstanding considerable periods deficient in rainfall. Compound horizontal steam engines, each capable of developing 180 horse power, drive pumps which lift the water from the well and pump it into supply at a maximum rate of 170,000 gallons an hour. The whole of the plant is duplicated as a precaution against breakdown.

CHERRY HINTON WORKS ABANDONED

The needs of the 70,000 population supplied in 1921 were already approaching an average consumption of two-and-a-half million gallons a day, but the powerful reinforcement of the Company's supplies provided by the new Fream Dyke well was more than sufficient to cope with this and enabled the Company to shut down both the Fulbourn and Cherry Hinton stations. The Cherry Hinton



RUSTAT ROAD WORKSHOPS.

works, situated in an area which was fast being engulfed in the outskirts of Cambridge, were completely dismantled, the wells sealed, and the site sold, the land at the Spring Head being presented to the Corporation as a public amenity. The Fulbourn pumping station was, however, retained, and after some twenty years, recourse has again been made to it to help meet the ever-growing demands of the last few years. As will be seen later, this well has still a very useful part to play.

The quality of the water from the Fleam Dyke well has consistently proved to be of the highest possible standard. Nevertheless, samples of the water, as delivered to the consumer, continue to be carefully examined bacteriologically and chemically at frequent intervals, and every possible precaution is taken to prevent any fortuitous contamination of the well.

WATER SOFTENING

The only respect in which this water leaves anything to be desired is that, like every water supply drawn from the Chalk, it is rather hard. The Company's Directors decided that to reduce the hardness would confer a benefit upon the population of Cambridge sufficient to justify the expense, and in 1935 the Company became the first in this country to install water softening plant voluntarily and without any increase in water rates or charges. The resulting financial benefit to the consumers from the saving of commodities in frequent use, such as soap and tea, and the lessened amount of furring in kettles and hot water apparatus is estimated to amount to a substantial sum every year. As pumped from the well the water has 16 degrees of hardness, i.e., it contains 16 grains of dissolved chalk per gallon; to remove all this hardness would be prohibitively

expensive, and would moreover render the water unpalatable and capable of dissolving lead from pipes: it has been found that a reduction of hardness from 16 to 9 degrees best meets the situation.

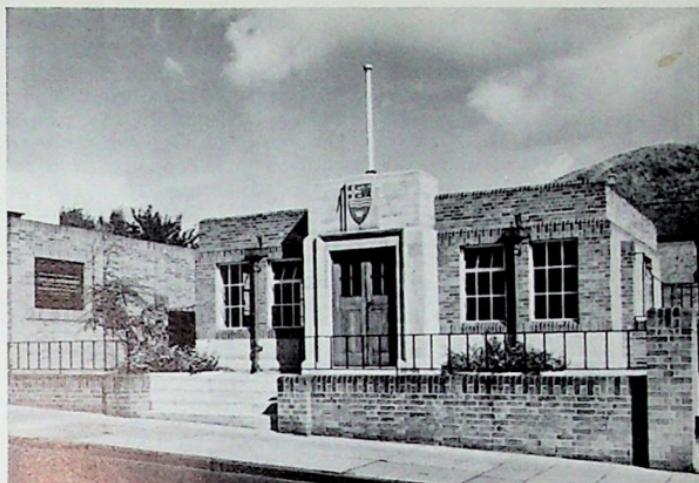
The process takes place at the Water Softening Station, a brick building of pleasing aspect on the south side of the road from Cambridge to Fulbourn. This building houses eight large containers in which a part of the water pumped from Fleam Dyke has its hardness totally removed by the base-exchange process. The resulting soft water is then mixed with the unsoftened water to produce a blended water containing only 9 degrees of hardness in place of the original 16 degrees. The softening material in the containers is not consumed, but has to be periodically regenerated by immersion in brine. The plant consumes no less than 1,400 tons of pure salt a year, the price of which has increased so materially in the post-war years that the cost of salt for softening the water is now of the same order as the cost of fuel for pumping the water from the well.

NEW WORKSHOPS AND STORES

Following upon the benefits to consumers resulting from the introduction of water softening, attention was turned to increasing the services which might be rendered in the maintenance and repair of fittings. The accommodation at the Company's headquarters in Bene't Street was much too small to allow of the development of a repair shop or for the orderly storage of materials and fittings. Accordingly in 1936 a site was acquired in Rustat Road, on the east side of Cambridge railway station, on which a large block of buildings was completed in 1937, providing workshops for plumbers, meter repairers, fitters, electricians and carpenters, with a department for the testing of fittings and appliances, and special accommodation for the storage of large quantities of materials and fittings. The buildings also contain offices and a mess room, with garages for the Company's fleet of transport. The surrounding land provides space for storage of pipes and other main-laying stores, and also houses for the works manager and two other members of the staff, while nearby in Coleridge Road four more houses were erected in 1938 for the accommodation of members of the repair staff who, working on a rota, are available for summons by day or by night for urgent repair work. That these improved facilities have been appreciated by consumers is evidenced by the very great increase in the amount of repairs done for the public since 1937: in fact, to many of these consumers it is the visits to their premises of the Company's courteous and efficient repair staff which constitute their personal link with the Water Company. A minor repair service inaugurated in 1931 is the re-washing of taps free of charge; introduced in the interests of reducing waste of water, it has become so popular that the number of taps re-washed without charge is now of the order of 15,000 a year.

AN ADDITIONAL RESERVOIR

The next matter to be dealt with was increased water storage capacity. This had for some time been a long-term project, but in 1938 with war clouds beginning to darken the horizon, the Company's



CASTLE HILL BOOSTER STATION.

Directors decided to deal with it at once as an essential part of civil defence, and an additional covered service reservoir of reinforced concrete construction and capable of holding two million gallons was completed in 1939 and immediately put into service, raising the total storage capacity to four million gallons.

BOOSTER PUMPS

During the period of the second World War little could be done to add to the Company's equipment, while the demand for water rapidly increased by reason of the growth of population and industry in Cambridge itself, and through supplies provided to the Chesterton Rural District Council for the large aerodromes in their area of administration. Increasing difficulty was found in maintaining an adequate pressure in the mains supplying places to the west of Cambridge situated on relatively high ground and far from the reservoirs, and as soon as possible after the war the Company constructed its first booster station, a small auxiliary pumping plant worked by electricity and entirely automatic in action. This station is to be seen on Castle Hill, and was put into service in 1946. Its function is to increase the pressure of the water in the mains supplying Girton and Histon and parishes beyond them, and thus to afford an improved supply. In 1950 a second booster station was erected in Madingley Road to re-pump the water in the main to a water tower situated on the high ground west of Madingley Hill, which has enabled the Company to bring water to the villages of Madingley and Coton and thus complete the programme of providing a piped water supply to every parish in its statutory area.

NEW WORKS AT FULBOURN

To-day, at the beginning of its second century, the Company has several important projects. Work is already proceeding on the reconstruction of the old pumping station at Fulbourn to enable the well there to be taken into permanent use, and the Minister of Housing and Local Government has made an Order authorising this to be done as soon as the village of Fulbourn has been sewer'd. The water will be raised by electric pumps, and the former boiler house and fuel store is being converted into a large chlorination chamber in which all water pumped from the well will be treated to ensure its absolute sterility before entering the mains. Thus at long last the Company's pioneer proposal for chlorination, rejected in 1910, will not only be sanctioned but enjoined by a Ministry Order! When the new plant is in full working order it is hoped to provide an additional two million gallons a day from Fulbourn to reinforce the supply from Fleam Dyke. Next in turn is the addition of a five-million-gallon service reservoir to the reservoirs now holding a total of four million gallons, on Limekiln Hill, Cherry Hinton. Whatever the needs of Cambridge and district for water may become, the Company means to provide them!

WASTE PREVENTION

A final word on what may be called the negative side of water supply; preventing the pumping of water which is not going to be used. The Company can also claim to be pioneers in this field, for, as long ago as 1884, when it was estimated that almost 50% of the water being pumped into supply was running uselessly to waste, they instituted a house-to-house inspection of fittings, with the result that in the following year the average daily consumption fell by 25%. During the past twenty years the Company has maintained a permanent waste detection staff, and with the aid of special meters installed at key points in the distribution system, which record on paper the hourly variations in the rate of flow, numerous night tests are made and leakages tracked down.

Much waste of water is caused by defective fittings, and in 1937 the Company opened, at their new Rustat Road workshops, a fittings testing department, where all apparatus intended to be used in the Company's area of supply is given a test under hydraulic pressure, which at once reveals defects. It is noteworthy that the proportion of fittings found to be defective has steadily declined, until it is now less than one per cent. Consumers thus have the assurance that their fittings are sound when installed. An equally important task, however, in eliminating waste of water is to secure the co-operation of the individual, and the Company has for many years carried out an active public relations campaign to encourage the consumer to use all the water he legitimately needs, but to waste none, and to report leakages whenever he sees them. As a result it can be justly claimed that in waste detection also the Company is in the forefront of water supply practice, the proportion of the "minimum night flow" which cannot be attributed to genuine use being one of the lowest among British water undertakings.

It is the Company's hope that these good relations will continue and that joint participation of the University and City in the management of the Company's affairs during the second century of its existence, with equal foresight in estimating demand and timely measures to supply it, will preserve unbroken the Company's proud record that, notwithstanding Cambridgeshire's low average rainfall and liability to serious droughts, it has never once been necessary to deprive the consumer of an unrestricted supply of pure and wholesome water.

THE GROWTH OF THE COMPANY

Year	Average daily Consumption Gallons	Total Annual Revenue £	Total Capital Expenditure £
1872	463.000	5.354	50.026
1892	1.008.000	15.020	119.827
1912	1.842.000	25.010	199.743
1932	2.220.000	53.925	352.617
1952	3.710.000	103.841	583.319

THE PRESENT DIRECTORS

THE RT. HON. HENRY WILLINK, M.C., Q.C., M.A., Master of Magdalene, Chairman.

TRESSILIAN C. NICHOLAS, O.B.E., M.C., M.A., F.G.S., Fellow of Trinity, Deputy Chairman.

WILLIAM ROWE ELWORTHY, O.B.E., A.C.A., Chartered Accountant.

SIDNEY ALFRED ROLFE, Wholesale Tobacconist.

ALDERMAN WILLIAM GLADSTONE JAMES, M.C., Builder.

PROFESSOR WILLIAM B. R. KING, O.B.E., M.C., Sc.D., F.R.S., F.G.S., Fellow of Magdalene, Woodwardian Professor of Geology.

THE RT. HON. VISCOUNT CALDECOTE, D.S.C., M.A., Fellow of King's

PHILIP PORTEOUS, M.I.C.E., Chartered Civil Engineer, Managing Director.

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